



MnRAM 3.4 Training Visual Guidance

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Presentation:

- **Database information**
 - **Download MnRAM software**
 - **Get started entering data**
 - **Various reports**
- **Using MnRAM**
 - **Field/office procedures**
 - **Step by step through a sample of the questions**



Downloading MnRAM 3.3




www.bwsr.state.mn.us/wetlands/mnram/index.html



- Home
- Wetlands**
- Easements
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- Outreach & Technical Services
- About the Board of Water & Soil Resources
- Publications /

The Minnesota Board of Water and Soil Resources

BWSR Mission: *Improve and protect Minnesota's water and soil resources by working in partnership with local landowners.*



QUICK LINKS

Your choices are below ▼

CLEAN WATER LEGACY

- > [Clean Water Council](#)
- > [BWSR Clean Water Legacy Act Information](#)

NEWS HEADLINES

BWSR

Data Collection Procedures, cont.

Before you go outside...



- **Collect background documentation:**
 - *Site survey,*
 - *hydrology,*
 - *topography,*
 - *aerial photos,*
 - *soils data*
- **Review other project information**



Special Features in detail, a-f

Is the wetland part of, or directly adjacent to, an area of special natural resource interest? Check those that apply:

- a. ☐ **Designated trout streams** or trout lakes (see MnDNR Commissioners Order 2450 Part 6262.0400 subparts 3 and 5) *(If yes, Fishery Habitat Rating is Exceptional).*
- b. ☐ **Calcareous fen** (Special Status see MN Rule Chapter 7050) *(If yes, Vegetative Diversity/Integrity functional rating is Exceptional) Consult MN DNR for regulatory purposes.*
- c. ☐ **Designated scientific and natural area** *If yes, then Aesthetics/Recreation/Education/Cultural functional rating is Exceptional).*
- d. ☐ **Rare natural community** (refer to MnDNR County Biological Survey/Natural Heritage) *(If yes, Vegetative Diversity/Integrity is Exceptional, also if question 36 is yes and Wildlife Habitat functional rating is Exceptional);*
- e. ☐ High priority wetland, environmentally sensitive area or environmental corridor identified in a local water management plan,
- f. ☐ Public park, forest, trail or recreation area.

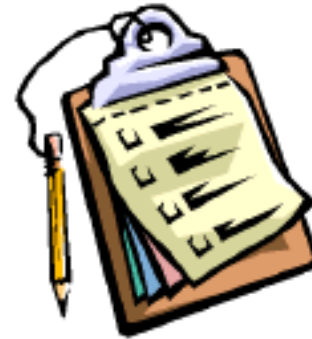
Going Into the field:

■ Equipment:

- *Laptop/tablet*
- *Field sheets*
- *GPS*
- *Camera*

■ References:

- Site, topo map
- Aerial photo





#1: Identify Plant Communities

- Up to five communities may be listed.
- *Each community's contribution to the whole wetland is counted as a percentage of 100%.*
- *Communities less than 10% are not counted*.*

Plant Community	%	Cowardin	Circular39	3. Veg Index
Shrub Carr	60	R2UBGx	Type 1	Low
Hardwood Swamp	20	L1UBGx	Type 1	High
Fresh (Wet) Meadow	20	PEMC	Type 2	Medium
* Fresh (Wet) Meadow	15B			
Shallow, Open Water Communities	16A			
Seasonally Flooded Basin	16B			
2. Floodplain Forest	3A			
Hardwood Swamp	3B			
Coniferous Bog	4A			
Coniferous Swamp	4B			
Open Bog	7A			

#3: Rate Plant Communities

Rate quality of each community:

Key out plant communities:

1. Floodplain forest, 3B – High
2. Sedge meadow, 13A – High
3. Shrub-carr, 8B – High
4. Shallow, open water, 16A – High
5. Shallow marsh, 13B – High

How many plant communities do you see?

Unsure after seeing the ratings? Reconsider your classification.





#2: Dominant Species/Cover class

Identify the dominant species that make up at least 10% coverage...

2. Using the 50/20 rule, identify the dominant species within the evaluated wetland area, the cover class of each species, and the origin of each species (i.e. native or non-native). Use species list (included in the table to the right which includes non-native status) and six cover classes provided in the table. (Adapted from Kuchler, A.W. 1967, Vegetation Mapping, The Ronald Press, New York, New York):

Note: Cover Class 1 and 2 are for use with invasive species only.

2. Dominant Species	% Cover	Native?	Invasive/Noxious
elm, American	>3-<10%	Yes	
buckthorn, common	>10-25%	No	I
loosestrife, purple	0-3%	No	I
lady's slipper, showy	1	Yes	

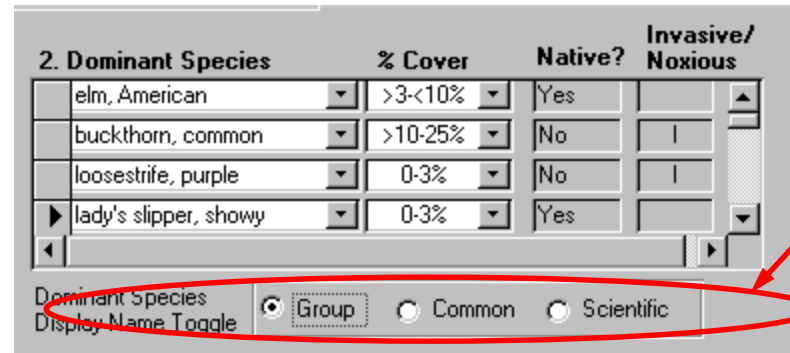
Dominant Species Display Name Toggle ☒ Group ☐ Scientific

1 0-3%
2 >3-<10%
3 >10-25%
4 >25-50%
5 >50-75%
6 >75-100%

[Click here for a drop-down Cover Category list...](#)

#2: Dominant Species drop-down list

- Look up species by common/group name or by scientific name.
 - Click the Display Name Toggle to alternate.
 - Don't try to list every plant.
- Use the <3% cover class only for rare or invasive species.



2. Dominant Species	% Cover	Native?	Invasive/Noxious
elm, American	>3-<10%	Yes	
buckthorn, common	>10-25%	No	I
loosestrife, purple	0-3%	No	I
lady's slipper, showy	0-3%	Yes	

Dominant Species
 Display Name Toggle: ☒ Group ☐ Common ☐ Scientific



Field Worksheet: Side 1

- On the Excel worksheet, each community has its own section.
- You enter cover class and invasives, as well as community quality.

#1	Community Number (circle each community which represents at least 10% of the wetland)	3A, 3B, 4A, 4B, 7A, 7B, 8A, 8B, 10A, 13A, 13B, 12B, 14A, 15A, 15B, 16A, 16B
#2 & #3	~ Describe each community type individually below ~	
Plant Community #1	Community Type (wet meadow, marsh)	- .
	Community Proportion (% of total)	
	Dominant Vegetation / Cover Class	
	Invasive/exotic Vegetation / Cover Class	
Plant Community #2	Community Quality (E, H, M, L)	- 0
	Community Type (wet meadow, marsh)	- .
	Community Proportion (% of total)	
	Dominant Vegetation / Cover Class	
Plant Community #2		
	Invasive/exotic Vegetation / Cover Class	
Plant Community #2	Community Quality (E, H, M, L)	- n



#4-5: Rare or endangered vegetation

- 4. Y N Are state or federally listed rare plant species or species found or known to be found recently?
- 5. Y N Is the wetland plant community scarce or rare within the watershed, imperiled (S2), or critically imperiled (S1).?

The DNR's Natural Heritage Program has developed a ranking system that is intended to reflect the extent and condition of natural communities and species in Minnesota.



#6: Pre-European-settlement Condition

Y N Does the wetland represent pre-European-settlement conditions? (e.g. MnDNR Native Plant Communities publication)

If yes, then Vegetation function is **Exceptional**
(continue to answer subsequent questions).

Created wetlands would not qualify, regardless of quality.

Field Worksheet: Side 2

MnRAM 3.0 Wetland Assessment Methodology Score Sheet							
Date: _____		Wet ID _____	Wet ID _____	Wet ID _____	Wet ID _____		
MnRAM							
#	Question Description	Rating	Rating	Rating	Rating		
7	Hydrogeomorphology and Topography (circle one)	Depressional/Isolated, Depress'I/Flow-through, Depress'I/Tributary, Riverine, Lacustrine, Peatland, Floodplain, Slope, Other	Depressional/Isolated, Depress'I/Flow-through, Depress'I/Tributary, Riverine, Lacustrine, Peatland, Floodplain, Slope, Other	Depressional/Isolated, Depress'I/Flow-through, Depress'I/Tributary, Riverine, Lacustrine, Peatland, Floodplain, Slope, Other	Depressional/Isolated, Depress'I/Flow-through, Depress'I/Tributary, Riverine, Lacustrine, Peatland, Floodplain, Slope, Other		
8	Maximum Water Depth (inches) : % inundation	:	:	:	:		
9	Local Watershed Area--immediate drainage (acres)						
10	Estimated size of existing wetland (acres)						
11	SOILS: Upland/Wetland (survey classification + site)						
12	Outlet characteristics for flood retention	H M L N/A	H M L N/A	H M L N/A	H M L N/A		
13	Outlet characteristics for hydrologic regime	H M L	H M L	H M L	H M L		
14	Dominant upland land use	H M L	H M L	H M L	H M L		
15	Soil condition (wetland)	H M L	H M L	H M L	H M L		
16	F-T: Emergent vegetation (% cover)	____ %	____ %	____ %	____ %		
17	Flow-through emerg. veg. (roughness coefficient)	H M L	H M L	H M L	H M L		
18	Sediment delivery	H M L	H M L	H M L	H M L		
19	Upland soils (based on soil group)	H M L	H M L	H M L	H M L		
20	Stormwater runoff pretreatment & detention	H M L	H M L	H M L	H M L		
21	Subwatershed wetland density	H M L	H M L	H M L	H M L		
22	Channels/sheet flow	H M L	H M L	H M L	H M L		
23	Upland buffer average width (feet)	____ feet	____ feet	____ feet	____ feet		
24	Upland area management (% of each, minimum 20%)	H M L	H M L	H M L	H M L		
25	Upland area diversity and structure (% percent of each)	H M L	H M L	H M L	H M L		
26	Upland area slope (% in each category)	H M L	H M L	H M L	H M L		



Field Worksheet: useful tips

- The *italicized questions* require maps or other data to be answered.
- Every other question is formatted as bold just to make it easier to read.
- If the question asks for a percentage of H-M-L, put the percentage of each under the correct heading:

H	M	L
20%	60%	20%



#8-10: Site data

8. Approximate maximum depth of standing water in the wetland (inches): _____
Percent of wetland area inundated: _____%
9. What is the estimated area of the wetland's immediate drainage area in acres? _____
10. Wetland size. This information should have been entered on the General Information page. The number remains as a placeholder.



MnRAM Rating Questions

- **Starting with question #12 through #57**, questions are answered (generally) by filling in A-B-C and form the **basis for the formulas** for calculating each functional score.
- **Each question has guidance** to assist the user in interpreting the question and **understanding how to answer** in difficult site conditions...



Purpose of Guidance:

- Explains the *intent of the question*.
- Suggests *examples of how to answer* given certain conditions.
- Points out *common errors or misconceptions* about that particular question.



#12: Outlet/Flood retention

For depressional wetlands, describe the wetland surface and subsurface outlet characteristics as it relates to the wetland's ability to detain runoff and/or store floodwater.

High = No surface or subsurface outlet, or a restricted outlet at or greater than 2 feet higher than the wetland boundary

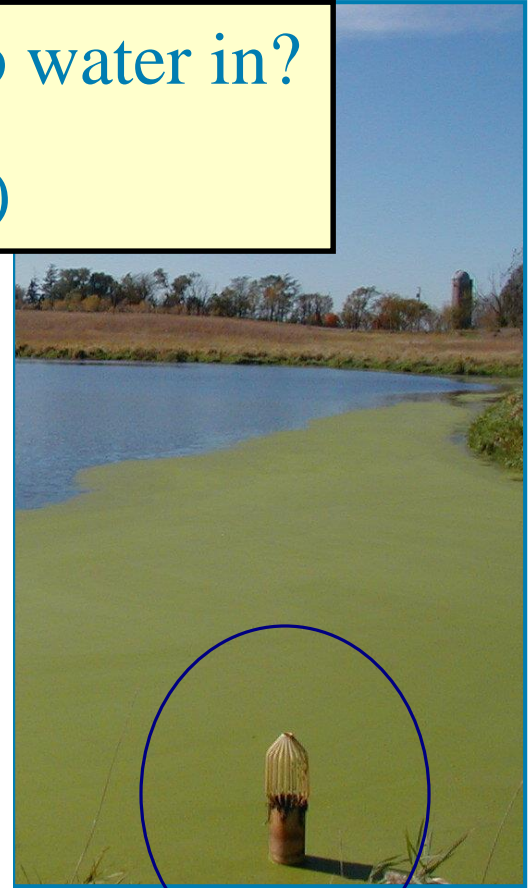
Medium = Swale, channel, weir, or other large, surface outlet (>18 inch pipe) with outflow elevation 0-2 feet above the wetland boundary, subsurface tile with no surface inlet.

Low = Wetland outflow elevation below the wetland boundary with either a high capacity surface outlet (swale, channel, weir, pipe >18 inch diameter, etc...) or a subsurface outlet (drain tile) with a surface inlet.

N/A = Not applicable for floodplain, slope, lacustrine, riverine, and extensive peatland/flat wetlands.

#12: Outlet for Flood

How well can this wetland keep water in?
(The more, the better.)





#13: Outlet/hydrologic regime

Describe the wetland surface and subsurface outlet characteristics as it relates to the wetland hydrologic regime:

High = No outlet, natural outlet condition, or a constructed outlet at the historic outflow elevation; no evidence of subsurface drainage (drain tile).

Medium = Constructed, reduced capacity outlet below the top of the temporary wet meadow zone; moderate indications of subsurface drainage; outlet raised above the wet meadow zone if managed to mimic natural conditions; watercourse has been recently ditched/channelized.

Low = Excavated or enlarged outlet constructed below the bottom of the wet meadow zone; strong indications of subsurface drainage; outlet removes most/all long-term and temporary storage; or outlet changes hydrologic regime drastically.

#13: Outlet for hydrologic regime

How natural is this wetland's outlet?
(Less human intervention = better.)



- H – only for natural outlet conditions
- M – constructed outlets, no hydro. change
- L – changed hydrology (higher *or* lower)



#12&13 Guidance: outlet characteristics

The ability of a wetland to maintain a hydrologic regime characteristic of the wetland type is somewhat dependent upon whether a natural outlet is present, or whether an outlet has been constructed or modified by humans. Constructed outlets can significantly diminish the ability of a wetland to provide temporary

If the constructed outlet changes the wetland to non-wetland or to deepwater habitat or from saturated conditions to open water or from open water to saturated then it is rated **low**.

temporary wetland zone, but is such that the wetland is able to provide some temporary and long-term water retention (i.e. the wetland is only partially drained), the rating should be **medium**. Constructed outlets, either surface or subsurface, which remove most or all temporary and long-term retention capabilities, significantly reduce the ability of the wetland to maintain its characteristic hydrologic regime; the rating should be **low**. Constructed outlets that keep open water wetlands open water or keep saturated wetlands saturated are rated **medium**.

#16-18: Flow-Through Wetlands

#16: Percent vegetated

#17: Roughness coefficient

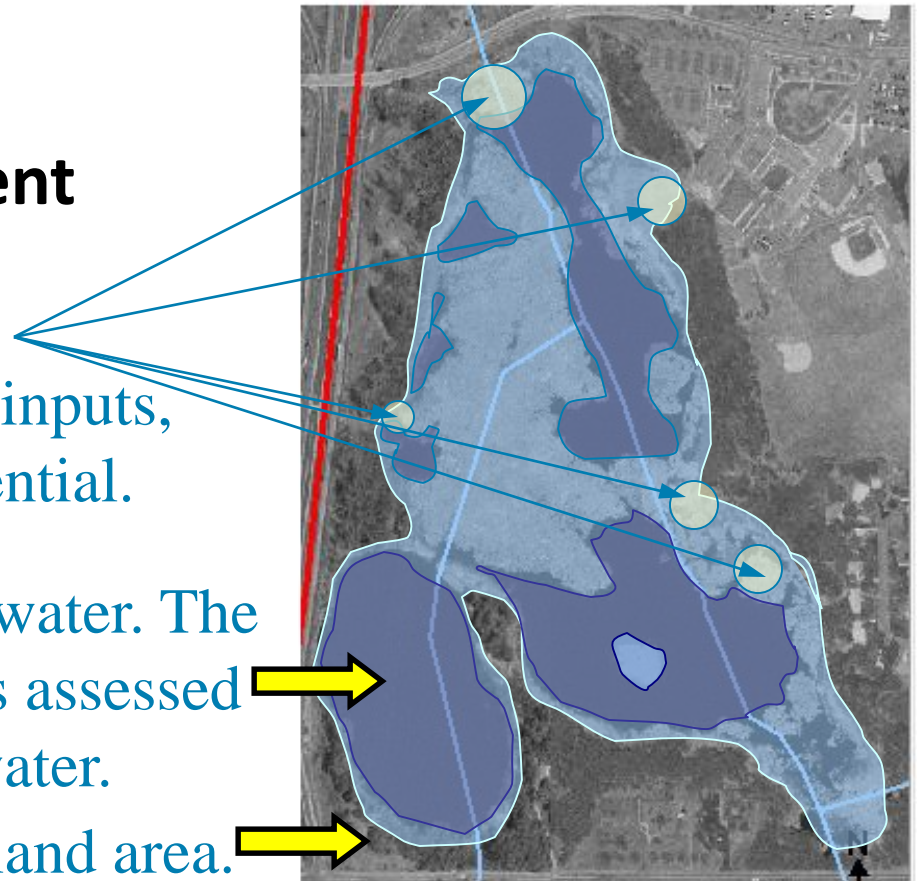
#18: Sediment delivery

Direct stormwater inputs,
mostly from residential.

Darker areas are open-water. The
remaining vegetation is assessed

for its ability to slow water.

Outline of wetland area.



#19: Upland watershed soils

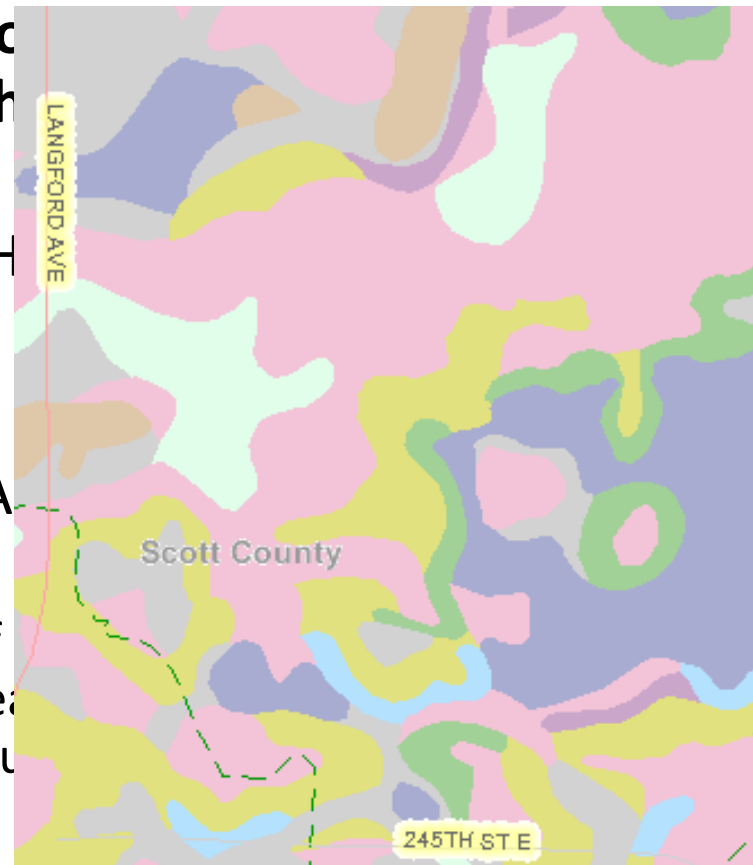
Describe the predominant upland soil in the immediate drainage area which is characteristic to the wetland:

High = Clays or shallow to bedrock (Hydrologic soil group A/D, B/D, C/D)

Medium = Silts or loams (Hydrologic soil group B)

Low = Sands (Hydrologic soil group A)

Guidance: Watershed Soils. Greater runoff in watersheds having primarily impermeable soils can impede water infiltration and so produce



#20: Stormwater runoff

Describe the characteristics of stormwater, wastewater, or concentrated agricultural runoff detention/water quality treatment prior to discharging into the wetland:

High = Receives significant volumes of untreated/undetained stormwater runoff, wastewater, or concentrated agricultural runoff directly, in relation to the wetland size.

Medium = Receives moderate volumes of directed stormwater runoff, wastewater, or concentrated agricultural runoff in relation to wetland size, which has received some treatment (sediment removal) and runoff detention.



Low = Does not receive directed stormwater runoff, wastewater, or concentrated agricultural runoff; receives small volumes of one or more of these sources in relation to wetland size; or stormwater is treated to approximately the standards of the National Urban Runoff Program (NURP); and runoff rates controlled to nearly predevelopment conditions.



#21:Wetland density

Describe density of wetlands within the subwatershed (*the 5,600 DNR minor watersheds as defined in Minnesota Rules 8420.0110, Subp. 31*) and the opportunity for contributing to floodwater detention:

High = Wetlands make up less than 10% of the subwatershed area.

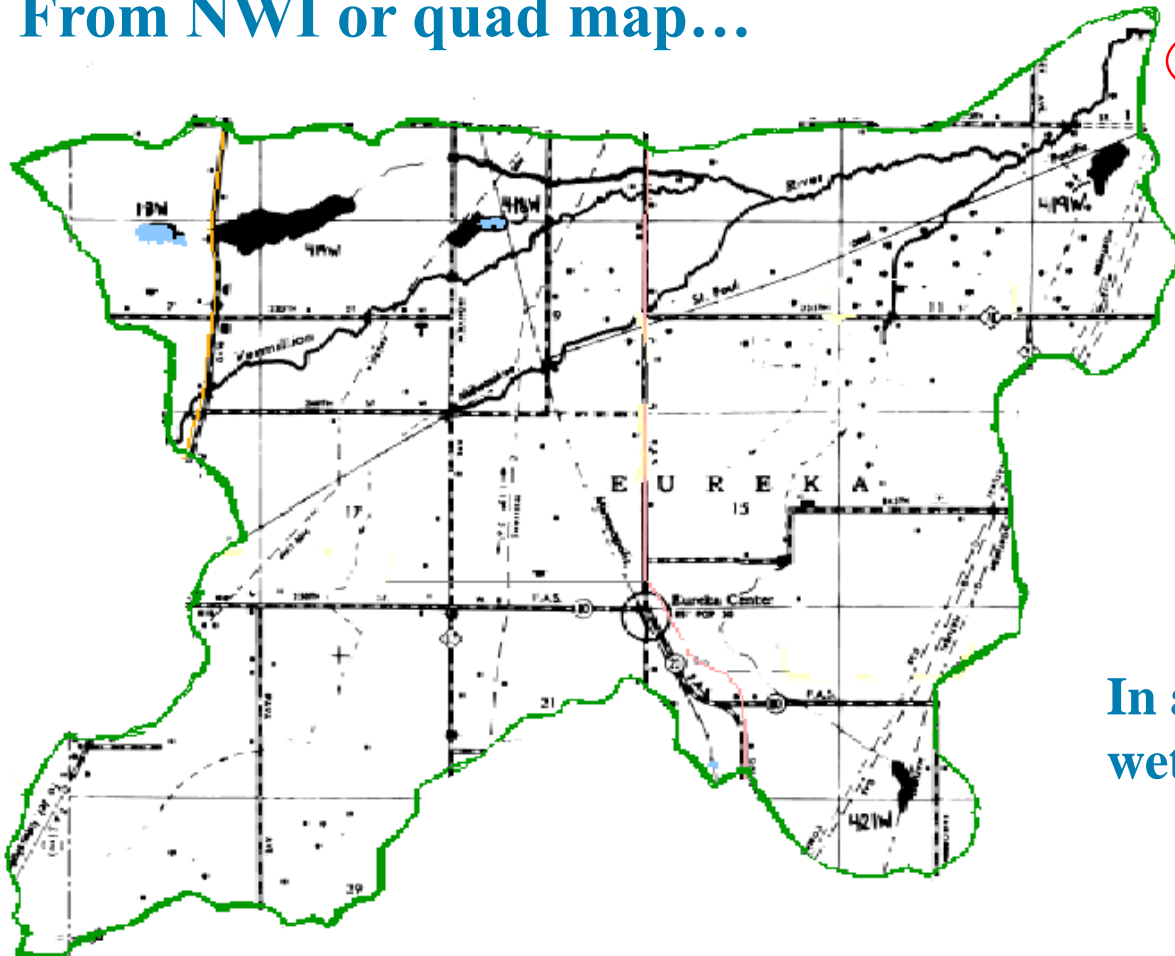
Medium = Wetlands make up 10-20% of the subwatershed.

Low = Wetlands make up more than 20% of the subwatershed.

Guidance: The density of wetlands in the sub-watershed will determine the benefit each provides downstream. Wetlands reduce flood peaks up to 75 percent compared to rolling topography when they occupy only 20 percent of the total.

#21: Subwatershed wetland density

From NWI or quad map...



High = <10%

Medium = 10-20%

Low = >20%

In a low-density area, existing wetlands are less dispensable.

#23–26: Upland area quality



Upland Area Demo

Veg. Cover (WQ):

80% Low—cropped/bare, paved

20% Medium—mowed vegetation

Diversity/structure

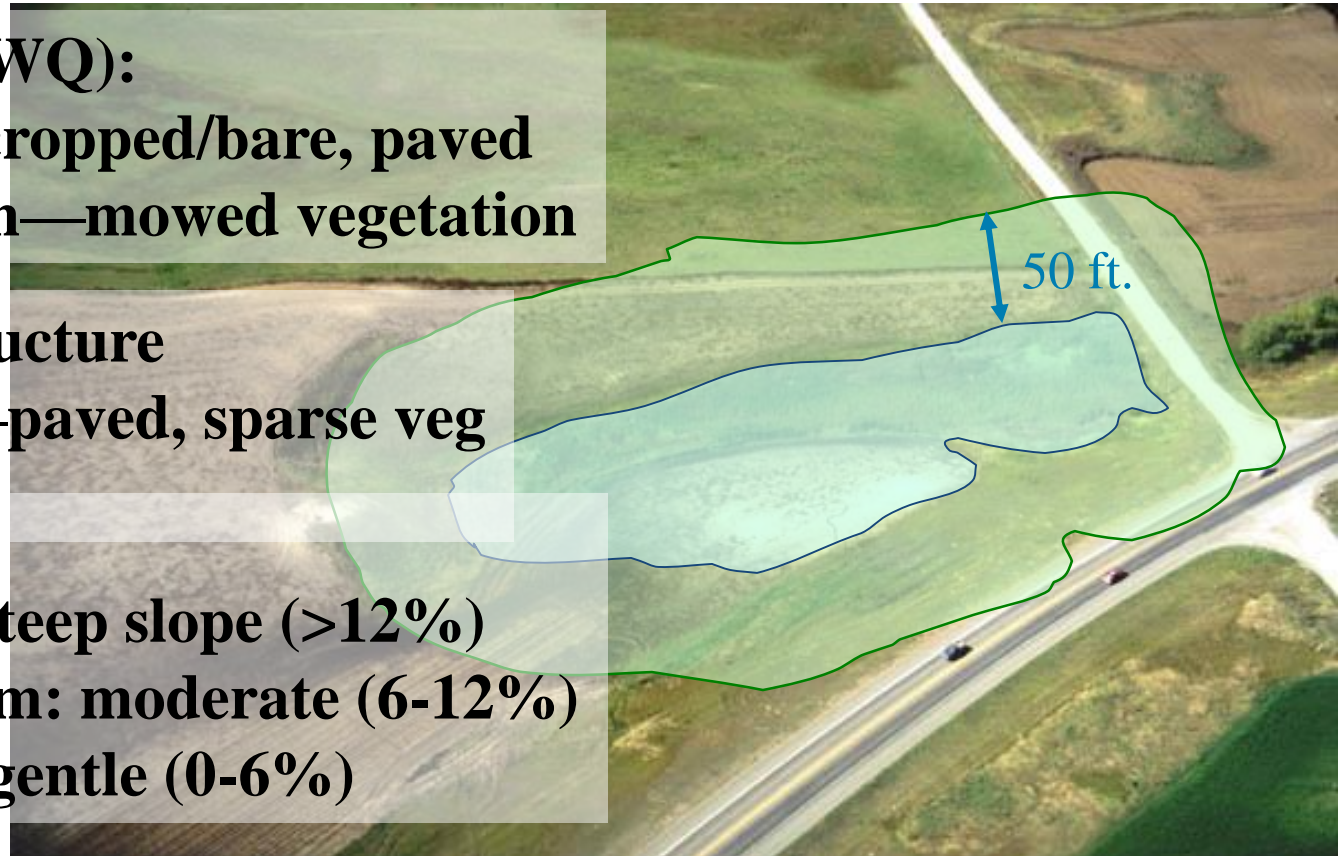
100% Low—paved, sparse veg

Slope:

20% Low: steep slope (>12%)

60% Medium: moderate (6-12%)

20% High: gentle (0-6%)





#27: Water Quality Protection (downstream resource)

Describe the proximity of the first recreational lake, recreational watercourse, spawning area or significant fishery, or water supply source downstream of the wetland:

High = One or more resource within 0.5 mile downstream via any form of channel, pipe, or isolated wetlands.

Medium = One or more resource within 0.5 to 2 miles downstream.

Low = No significant resources are located within 2 miles downstream.



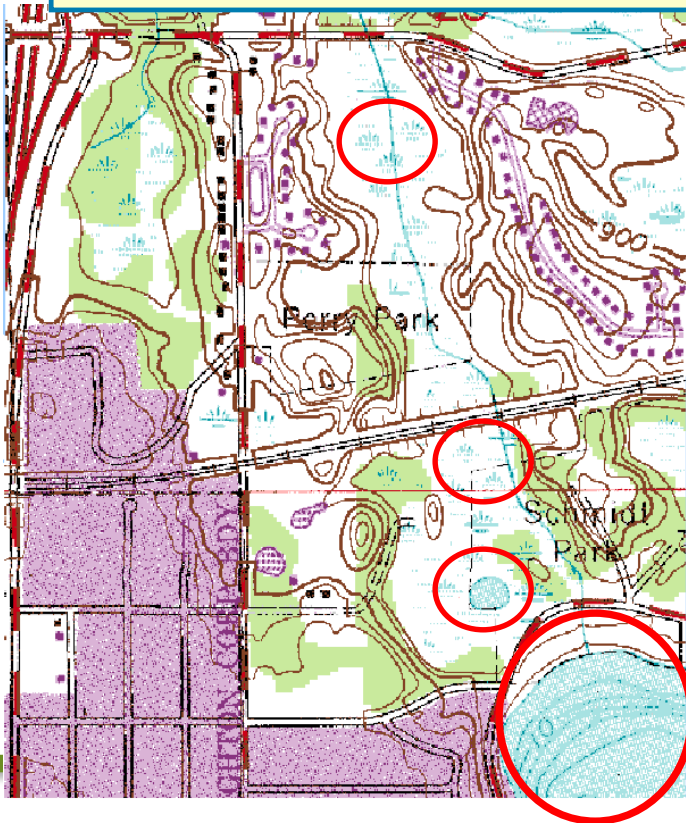
#27 Guidance, WQ protection (downstream sensitivity)

The *water quality function wetlands provide help disperse* the physical, chemical and biological *impacts of pollution in downstream waters.* Sensitive water resources located *within 0.5 miles downstream of the wetland* will realize the *greatest benefit to water quality* from the wetland...

#27 demo: water quality protection (downstream resource)

All these wetlands are upstream of Lake Johanna

Topo view



Aerial view



#28: Nutrient loading

Does the wetland water quality and/or plant community exhibit signs of excess nutrient loading:

High = No evidence of excess nutrient loading or nutrient sources (e.g. evidence of diverse, native vegetative community, no pipes, etc.).

Medium = Some evidence of excess nutrient loading source and evidence of plant communities such as dense stands of reed canary grass or narrowleaf, and/or blue (hybrid) cattail.

Low = Strong evidence of excess nutrient loading such as algal mats present or evidence of excessive emergent.

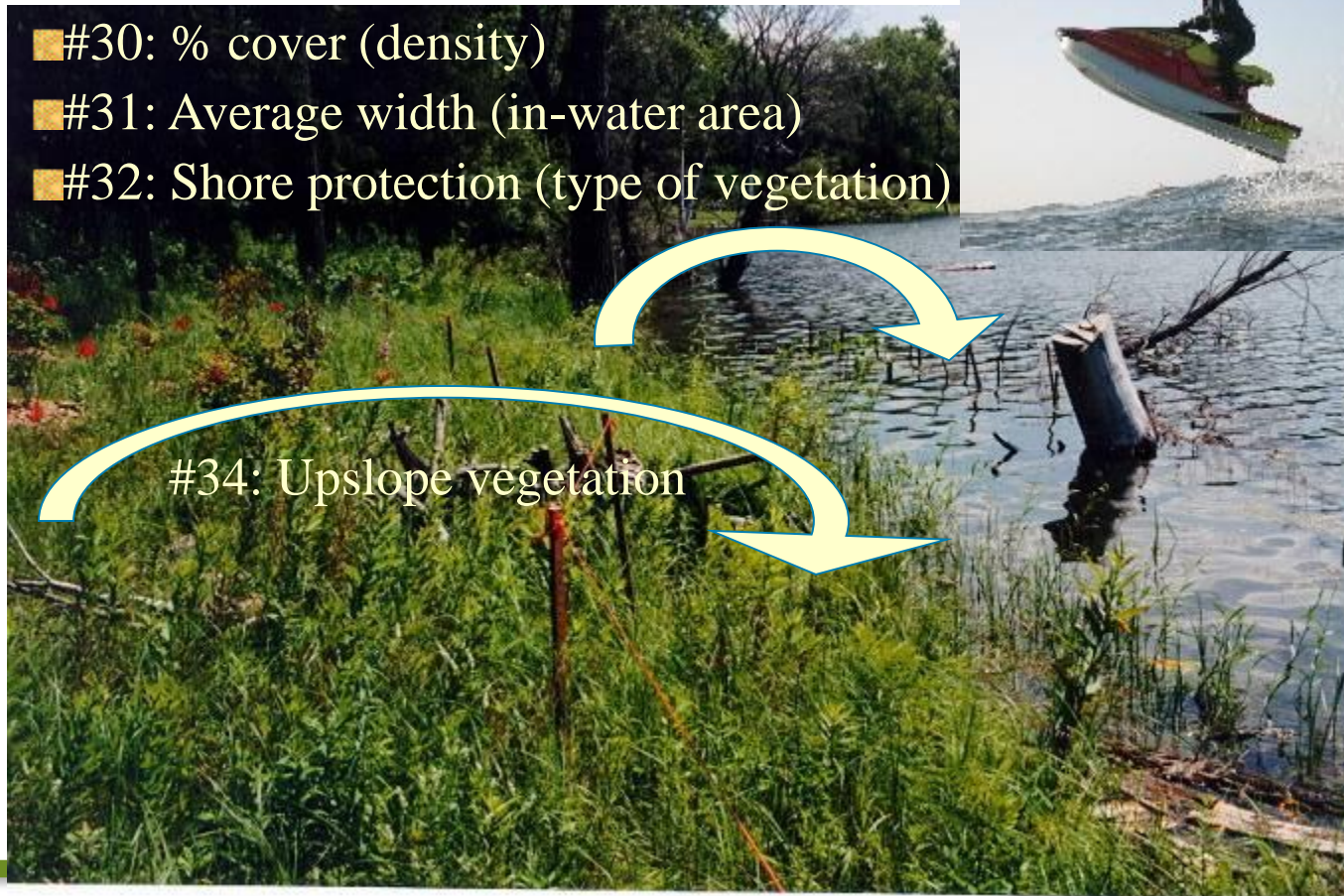
This rating is used in the formula for wetland water quality maintenance and, with the rating reversed, for downstream water quality protection.

#28 Guidance, nutrient loading



#29-34: Shoreland Questions

- #33: Erosion potential (opportunity)
- #30: % cover (density)
- #31: Average width (in-water area)
- #32: Shore protection (type of vegetation)



#34: Upslope vegetation

#35: Rare wildlife

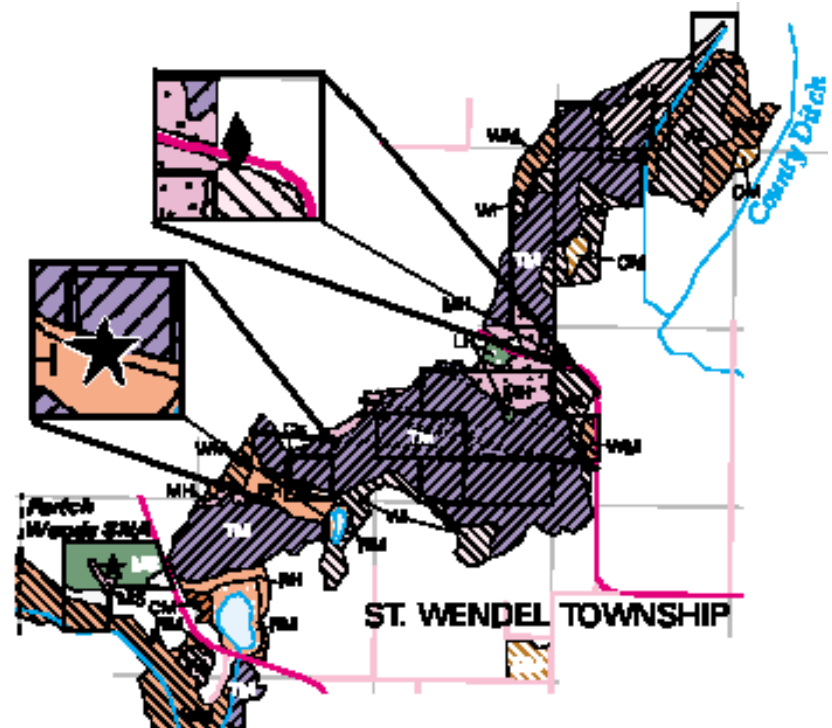
Y / N Is the wetland known to be used recently by rare wildlife species or wildlife species that are state or federally listed? **Guidance:** Rare wildlife species include any of those listed in the Minnesota Natural Heritage Database or County



If it is critical, call the DNR and ask. You may need to do a specialized assessment if wildlife is an issue for a project.



- **Mn Natural Heritage Database**
- **County Biological Survey**



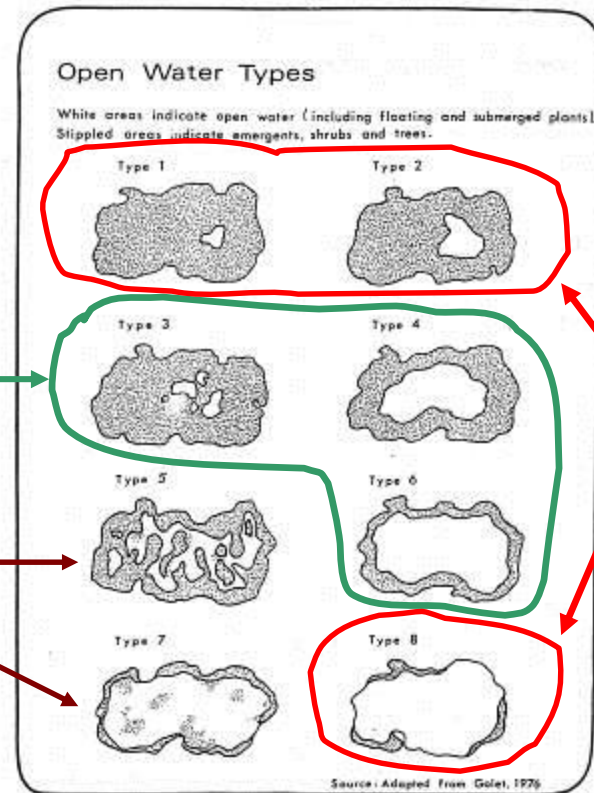
#37: Open water/cover interspersion

Measure of “edge effect” for
diversity and abundance.

Medium

High

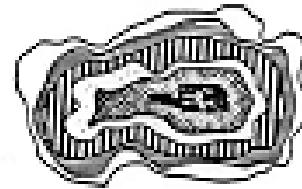
Low



#38: Veg. community interspersion

For wetlands having more than one vegetative community, indicate the interspersion category that best fits the wetland.

- **High** = Category 3
- **Medium** = Category 2
- **Low** = Category 1
- **N/A** = Only one vegetative community is present.



INTERSPERSION CATEGORY 1

← Low



INTERSPERSION CATEGORY 2

← Med



INTERSPERSION CATEGORY 3

← High



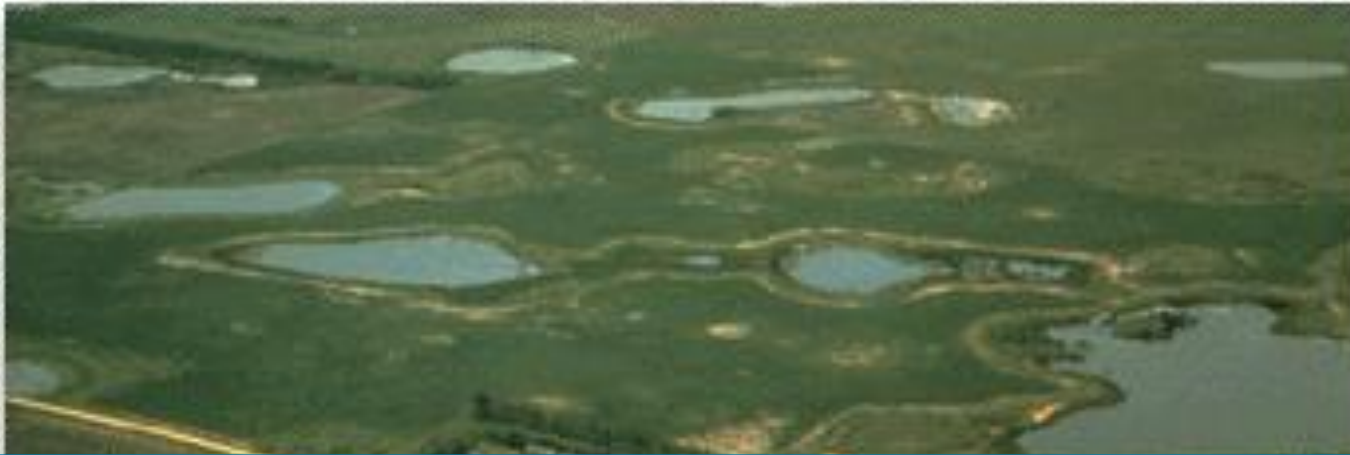
#38 Guidance, veg. interspersions

For wetlands with multiple vegetative communities, the increased structural diversity and amount of edge associated with greater interspersions is generally positively correlated with wildlife habitat.

Vegetative interspersions differ from open water interspersions in that the wetland may not have standing water, or may have open water with several communities interspersed (floating, emergent, submerged).

the one that looks most like the interspersions at your site.

#40 Guidance, wetland interspersion



- **H**—clustering OR last refuge
- **M**—average
- **L**—none close, but others exist nearby
(see demo, next slide)



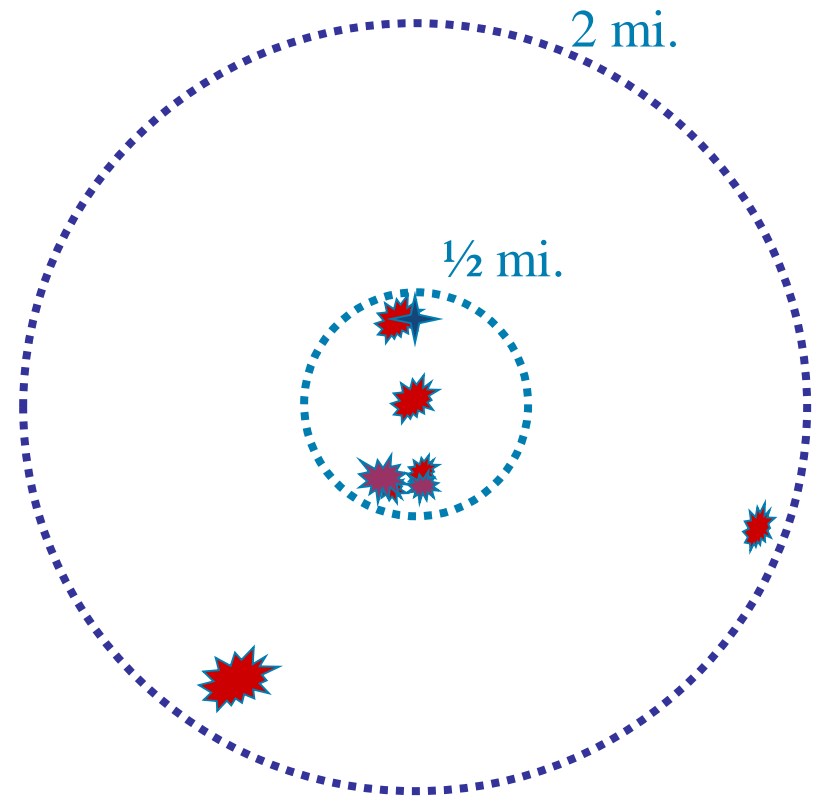
Landscape interspersion demo

H: No others within 2 miles
AND
site has veg rating of Med +
OR

H: 1/2 mile radius at least 3,
1 w/diff plant comm.

M: other wetlands within 1/2 mile

L: None < 1/2 mile, 1+ < 2 miles





#41: Barriers to wildlife movement

Habitat value diminishes when fragmented by barriers, which restrict wildlife migration and movement. Describe barriers present between the wetland and other habitats:



High = No barriers or minimal barriers present; i.e. low traffic; uncurbed roads, low density housing (> 1 acre lots), golf courses, utility easements, or railroads.

Medium = Moderate barriers present; i.e. moderately traveled; curbed roads, moderate density housing (1/3 to 1 acre lots), residential golf courses, low dikes.

Low = Large barriers present; i.e. 4-lane or wider, paved roads, parking lots, high density residential (<1/3 acres), industrial and commercial development.





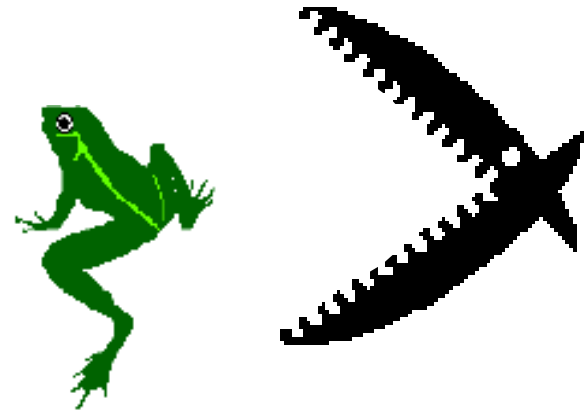
441 Guidance: Living with Life



#42–44: Amphibian habitat

The next set of questions tries to evaluate a wetland for its *function in promoting amphibian ecology*.

In addition to these questions, the formula for this function *includes other variables*:



- Buffer width
- Barriers
- Upland land use
- Storm water



#46: Fishery Quality

Is the wetland contiguous or intermittently contiguous with a permanent waterbody or watercourse such that it may provide spawning/nursery habitat for native fish species?

Exceptional = The wetland is a known spawning habitat for native fish of high importance/interest or the wetland is part of or adjacent to a trout fishery as identified by the DNR.

High = The wetland is lacustrine/riverine or is contiguous with a permanent water body or watercourse and may provide spawning/nursery habitat or refuge for native fish species, or shade to maintain water temperature in adjacent lakes, rivers or streams.

Medium = The wetland is intermittently connected to a permanent water body or watercourse that may support native fish populations as a result of colonization during flood events, or the wetland is isolated and supports native, non-game fish species.

Low = The wetland is isolated from a permanent water body or watercourse or has exclusive, high carp populations which cause degradation to the wetland.

N/A = The wetland does not have standing water at any time during the growing season.

#48-56: Aesthetics (values)

The next set of questions assesses wetland value *based on opportunity for human appreciation or use of the site.*





#57: Commercial effects and wetland quality

Is the vegetation or hydrology controlled or modified to sustain a commercial crop or other botanical products that may include: wild rice, cranberries, hay, pasture/grazing, row crops, white cedar, black spruce, tamarack, floral decorations, or other commercially-productive uses?

High = Commercial use does not permanently alter wetland characteristics. Uses may include: timber products, wild rice, hay, pasture, wet native grass seed production, etc.

Medium = Wetland characteristics have been altered but vegetation is still hydrophytic. Products may include: rice, cranberries, hay, pasture/grazing.

Low = Hydrology dramatically altered to produce non-hydrophytic row crops such as soybeans or corn.

N/A = This wetland is not used for any commercial products.



#58-63: Hydrogeology

The following questions relate to groundwater movement into and out of the wetland. Base your answers on the best available information.

Classification as primarily “recharge” or “discharge” is based on how a majority of the questions are answered and does not offer a definitive result as to actual groundwater movement.

Additional Questions

- Optional restoration-related questions, #64-72
- These questions may help identify wetlands needing restoration (*wetland banking*)





#64: Hydrologic Restoration Potential

Y N Does the wetland have the potential for hydrologic restoration without flooding: roads, houses, septic systems, golf courses or other permanent infrastructure / active agricultural fields or

Guidance: The purpose of this question is to identify opportunities for restoration of drained or partially drained wetlands. Generally, this question applies to wetlands which have been ditched or tiled for agricultural or other purposes.

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Run summary report

General Information	Introduction	Special Features	Vegetation (1 - 6)	Hydrology and Soils (7 - 22)	Buffer and Shore (23 - 34)
Habitat (35 - 47)	Value (48 - 57)	Groundwater (58 - 63)	Additional Information (64 - 72)	Summary	

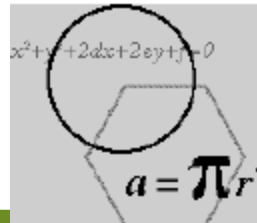
☒ Complete Refresh Values Print Summary

Vegetative Diversity	3a. Proportion of Wetland <i>(Percent Given)</i>	3b. Individual Community Scores <i>(VegQuality Ind)</i>	3c. Highest Rated Community Quality	3d. Non- Weighted Average	3e. Weighted Average
Community #1	60.00	0.10			
Community #2	20.00	0.50			
Community #3	20.00	0.50			
Community #4					
Community #5					
Community #6					
Community #7					
Overall Wetland Vegetative Diversity					0.26
Maintenance of Hydrologic Regime		Moderate		Moderate	Low
Flood/Stormwater /Attenuation	0.77	High			

This is the last tab in the database, where you can see individual ratings for each function for that particular wetland.

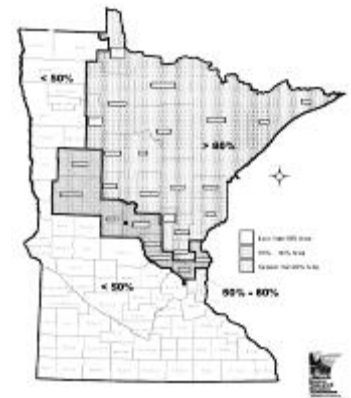
Formulas

- See *Comprehensive Guidance* for a description of all the formulas.
- Formulas are also *visible “in action” on the digital version of the Excel field worksheet.*

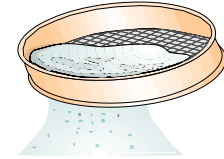


Management Classification

- A standard method for assessing MnRAM results, endorsed by the MnRAM Workgroup.
- Guide policy approaches using MnRAM wetland data.
 - Two levels allow flexibility for regional landscape or policy differences.

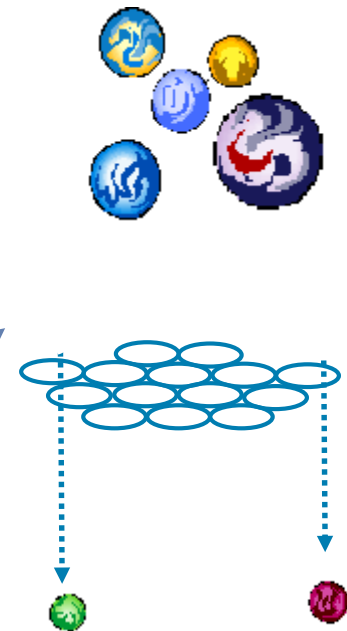
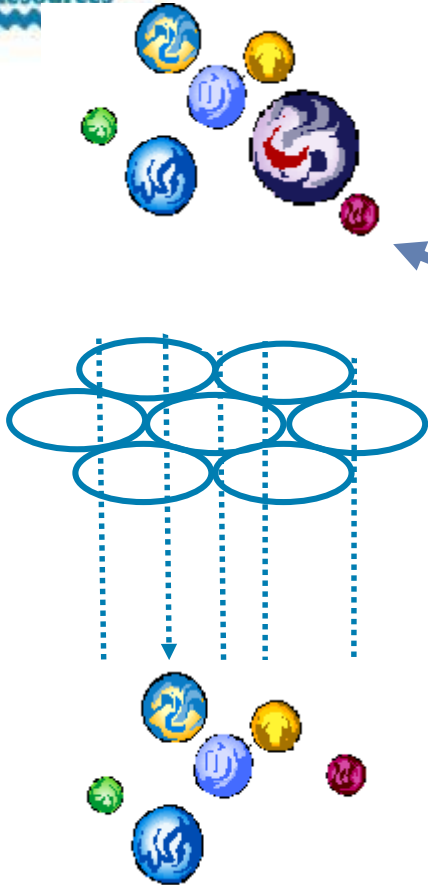


MC Preset Options: “Basic” or “Increased”



Basic Protection: fewer wetlands will remain in the “Preserve” category

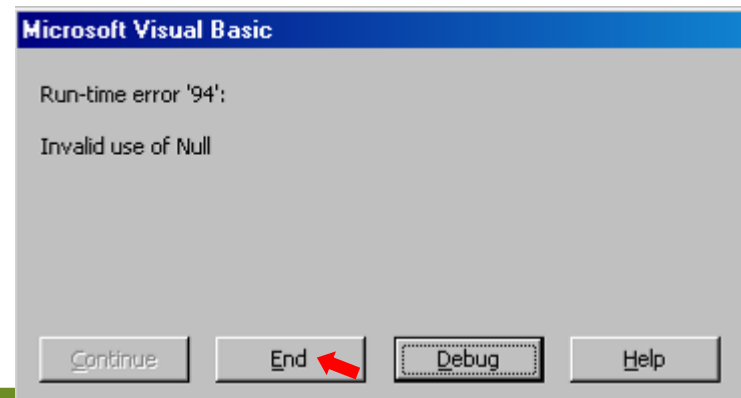
Increased Standard keeps more wetlands in the stronger protection levels.



Known bugs



Deleting an entry from #24-25-26 without entering a zero may result in a run-time error. Pressing <End> will return you to the field to correct your error.





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QUESTIONS?

